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DeRosa et al.

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(54) **SINGLE AND GROUPED PRESSURE VALVES**

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F16K 11/078	(2006.01)
F16K 11/085	(2006.01)

(52) **U.S. Cl.**

CPC ***F16K 11/078*** (2013.01); ***F16K 11/0856*** (2013.01); *Y10T 137/86662* (2015.04)

(58) **Field of Classification Search**

USPC 137/625.16, 625.17, 625.19, 636.4, 137/625.47

See application file for complete search history.

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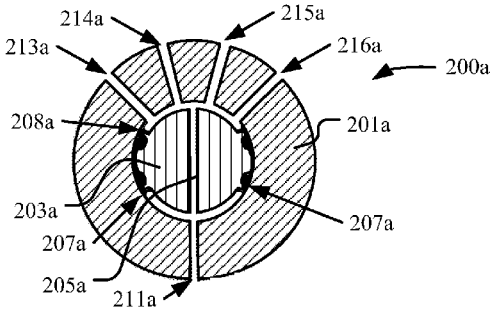
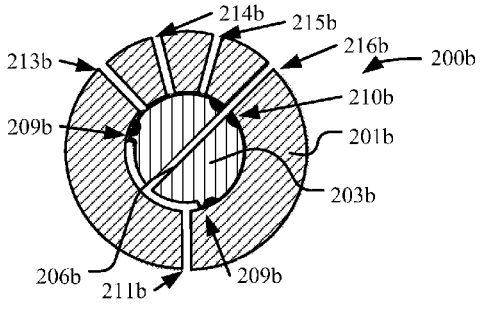
(57) **ABSTRACT**

This disclosure provides example methods, devices, and systems for a single and grouped pressure valve. In one embodiment, a pressure valve may include a housing having a first input port and a plurality of output ports and defining a cavity disposed therein; a flow coupler disposed in the cavity of the housing and having a passage transversely disposed therethrough, wherein the flow coupler is movable within the cavity of the housing; wherein a first alignment position of the flow coupler in the cavity of the housing allows fluid flow from the first input port of the housing through the passage of the flow coupler to all of the plurality of output ports of the housing; and wherein a second alignment position of the flow coupler in the cavity of the housing allows fluid flow from the first input port of the housing through the passage of the flow coupler to one of the plurality of output ports of the housing.

11 Claims, 5 Drawing Sheets





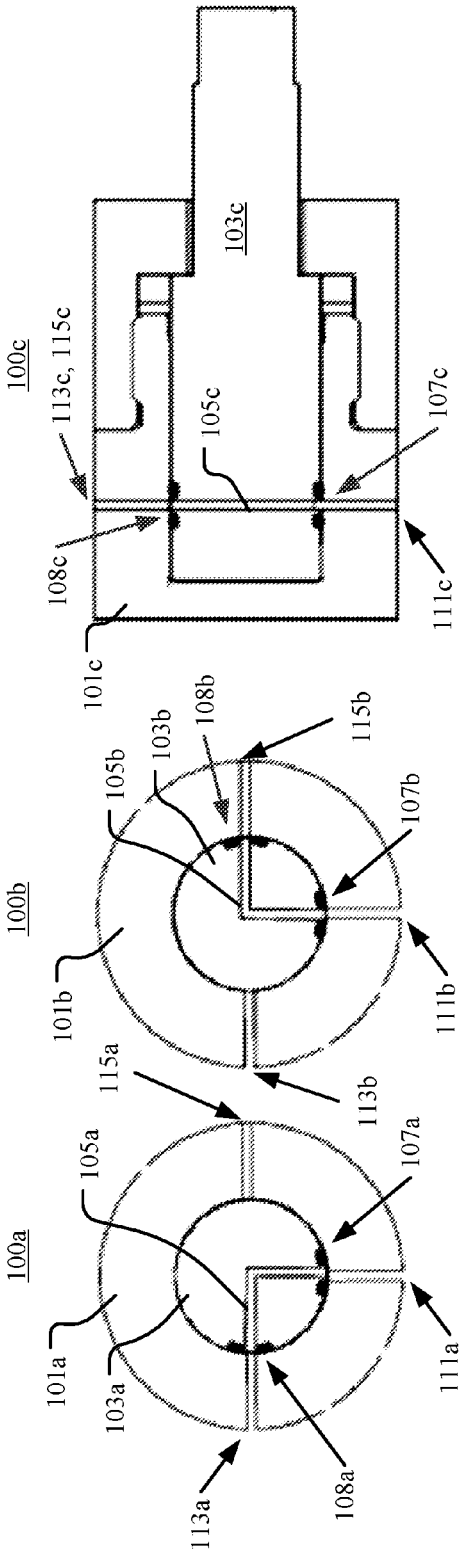


FIG. 1A
(PRIOR ART)

FIG. 1B
(PRIOR ART)

FIG. 1C
(PRIOR ART)

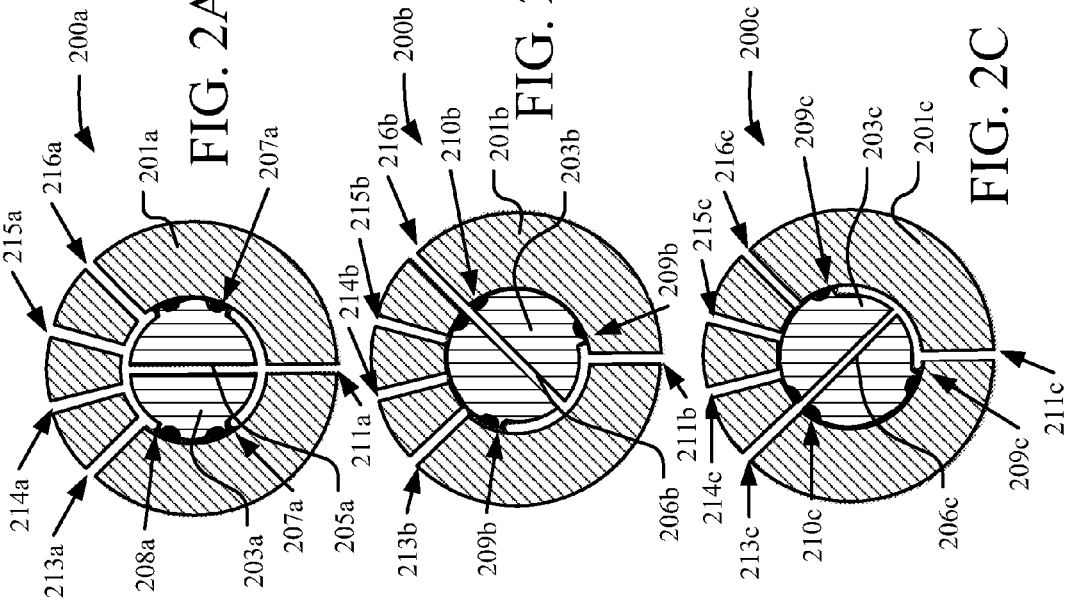


FIG. 2A

FIG. 2B

FIG. 2C

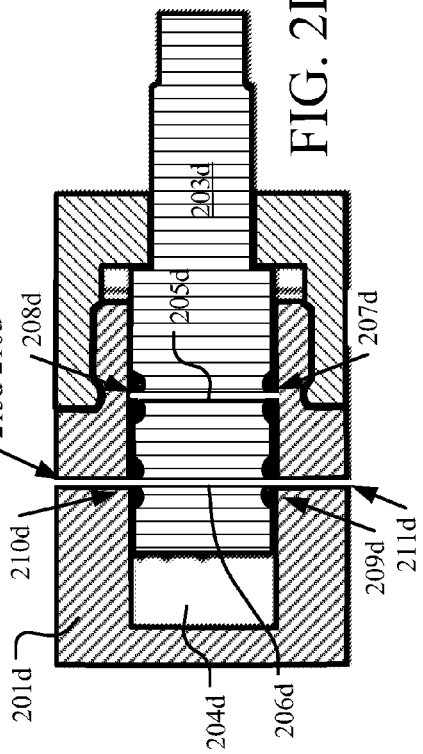


FIG. 2D

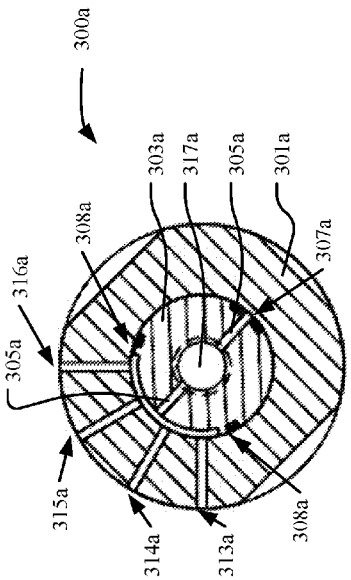


FIG. 3A

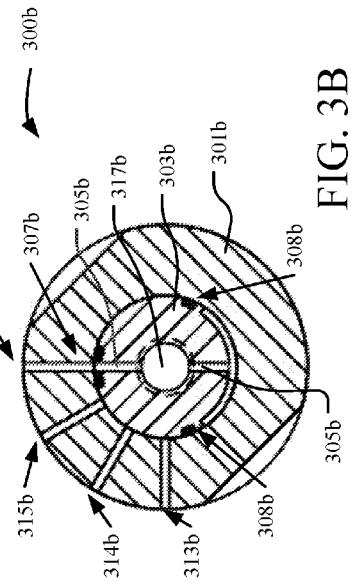


FIG. 3B

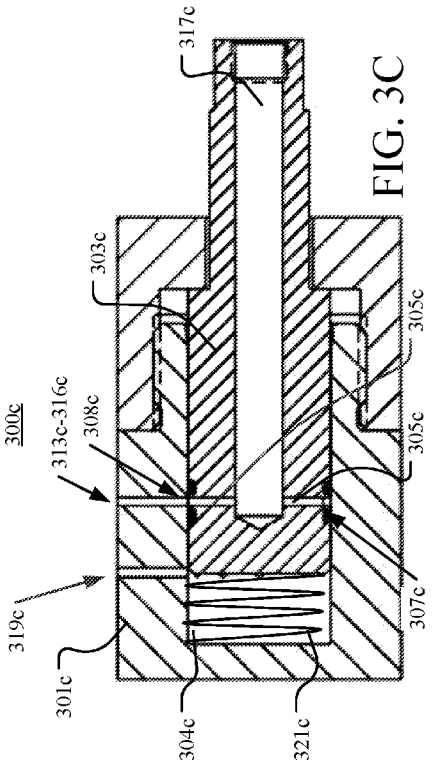


FIG. 3C

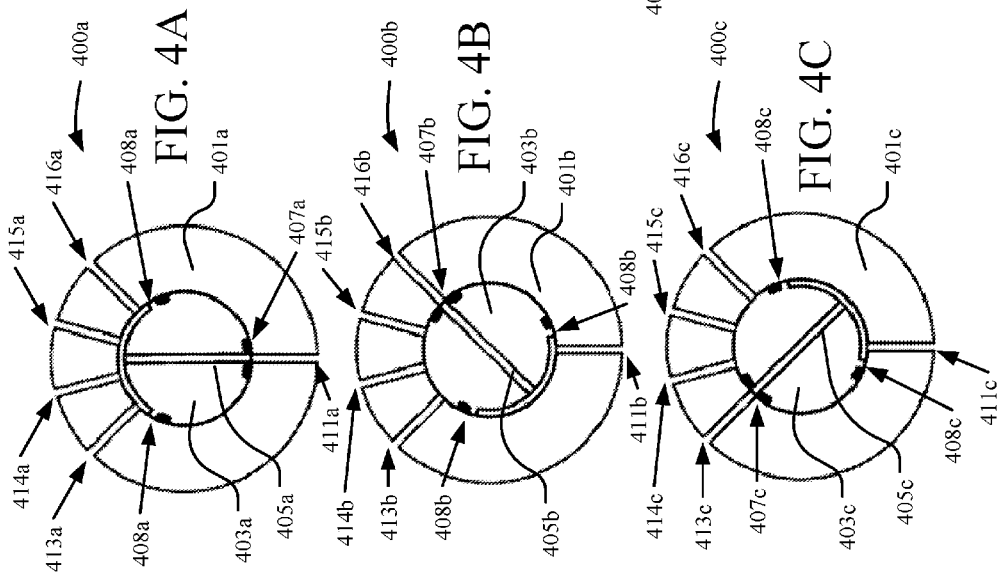

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FIG. 4A
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407b
403b
401b
414b
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405b
408b
411b
FIG. 4B
400c
415c
416c
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401c
414c
413c
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403c
405c
408c
411c
FIG. 4C
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403d
FIG. 4D

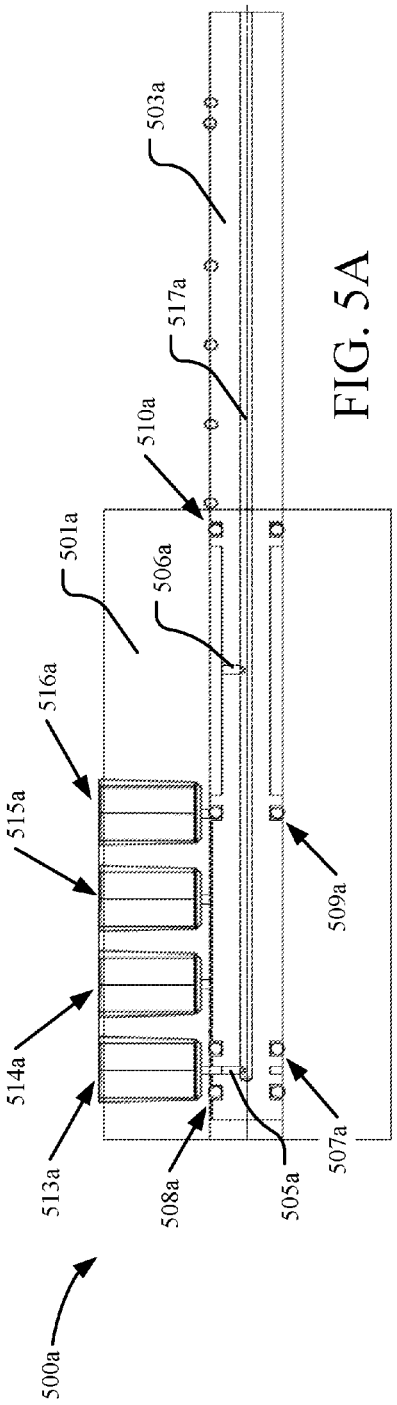
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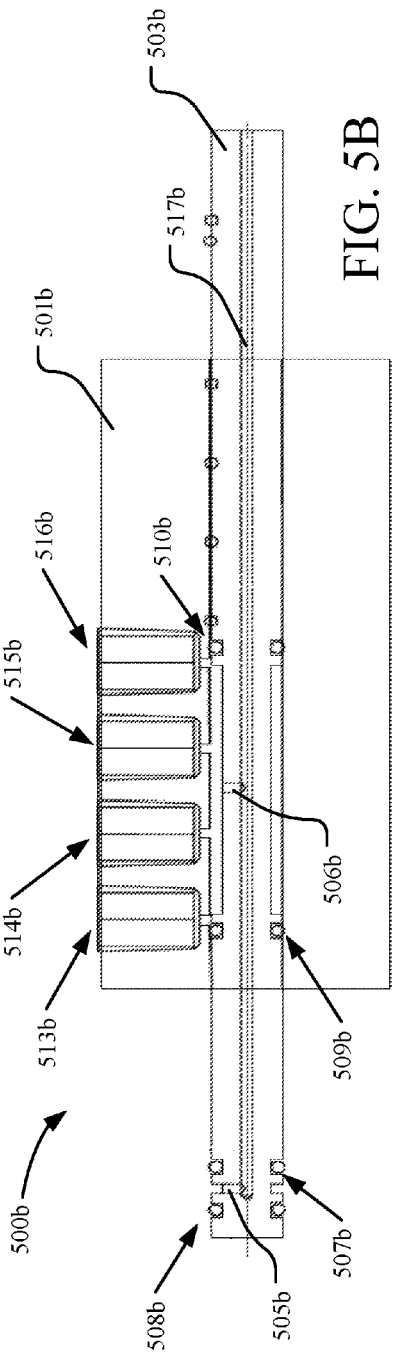
FIG. 5A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508b
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507b

FIG. 5B

SINGLE AND GROUPED PRESSURE VALVES

TECHNICAL FIELD

This disclosure generally relates to pressure valves and more particularly to a single and grouped pressure valve.

BACKGROUND

Pressure manifolds and pressure switches are common equipment such as used for testing. They are used to apply pressure to a variety of locations such as grouped pressure locations in the case of a pressure manifold and an individual pressure location in the case of a pressure switch. In some applications, it is desirable to simultaneously apply fluid flow, which may also be referred to as pressure, at all of a plurality of pressure locations during one instance and to individually apply fluid flow at a particular pressure location during another instance. This technique may be used to determine, for instance, a source of a pressure leak associated with the plurality of pressure locations. Further, this technique may be expedited by simultaneously applying fluid flow to all of the plurality of pressure locations to determine whether a pressure leak exists and then individually applying fluid flow to each of the plurality of pressure locations to determine the source of the leak. Currently, this technique may be accomplished by using a complex series of pressure switches or pressure check valves such that the fluid flow may be shut off at some pressure locations while being applied at other pressure locations and without the fluid flow leaking from one pressure location to another pressure location.

FIGS. **1**A to **1**C show various views of a prior art pressure switch **100***a-c*. FIGS. **1**A and **1**B illustrate a transverse cross-section of the prior art pressure switch **100***a-b*. FIG. **1**C illustrates a longitudinal cross-section of the prior art pressure switch **100***c*. The pressure switch **100***a-c* has a housing **101***a-c*, a flow coupler **103***a-c*, an input port **111***a-c*, a first output port **113***a-c* and a second output port **115***a-c*. Pressure enters through the input port **111***a-c* of the housing **101***a-c* and passes to the flow coupler **103***a-c* through an O-ring seal **107***a-c*. The flow coupler **103***a-c* is disposed around and defines a passage **105***a-c*, which allows fluid flow to be blocked or pass from the input port **111***a-c* to the first output port **113***a-b* or the second output port **115***a*-**115***b* through a second O-ring seal **108***a-c* of the flow coupler **103***a-c*. In FIG. **1**A, when the flow coupler **103***a* is rotated such that a first end of the passage **105***a* is coupled to the input port **111***a* and a second end of the passage **105***a* is coupled to the first output port **113***a*, the fluid flow passes from the input port **111***a* through the passage **105***a* to the first output port **113***a*. In FIG. **1**B, when the flow coupler **103***b* is rotated such that the second end of the passage **105***b* is coupled to the input port **111***b* and the first end of the passage **105***b* is coupled to the second output port **115***b*, the fluid flow passes from the input port **111***b* through the passage **105***b* to the second output port **115***b*. However, the flow coupler **103***b* does not have a configuration that allows fluid flow to simultaneously pass from the input port **111***b* to the first output port **113***b* and the second output port **115***b*. Accordingly, there is a need for improved techniques to allow for a single and grouped pressure valve. In addition, other desirable features and characteristics of the present disclosure will become apparent from the subsequent detailed description and claims, taken in conjunction with the accompanying figures and the foregoing technical field and background.

SUMMARY OF THE DISCLOSURE

Briefly described, embodiments of the present invention relate to a single and grouped pressure valve. According to one aspect, a pressure valve may include a housing having a first input port and a plurality of output ports and may define a cavity disposed therein. A flow coupler may be disposed in the cavity of the housing and may have a passage transversely disposed therethrough. Further, the flow coupler may be movable within the cavity of the housing. A first alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the first input port of the housing through the passage of the flow coupler to all of the plurality of output ports of the housing. Also, a second alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the first input port of the housing through the passage of the flow coupler to one of the plurality of output ports of the housing.

According to another aspect, a pressure valve may include a housing having an input port and a plurality of output ports and may define a cavity disposed therein. A flow coupler may be disposed in the cavity of the housing. A first portion of the flow coupler may have a first passage transversely disposed therethrough and a second portion of the flow coupler may also have a second passage transversely disposed therethrough. The flow coupler may be movable within the housing. A first alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the input port of the housing through the first passage of the flow coupler to one or more of the plurality of output ports of the housing. A second alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the input port of the housing through the second passage of the flow coupler to one of the plurality of output ports of the housing.

According to another aspect, a pressure valve may include a housing having a plurality of second output ports and defining a cavity disposed therein. A flow coupler may have an input port longitudinally disposed therethrough and a passage transversely disposed therethrough. The flow coupler may be disposed in the cavity of the housing and may be movable within the cavity. Further, the input port of the flow coupler may be coupled to the passage. A first alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the input port of the flow coupler through the passage of the flow coupler to one or more of the plurality of output ports of the housing. Also, a second alignment position of the flow coupler in the cavity of the housing may allow fluid flow from the input port of the flow coupler through the passage of the flow coupler to one of the plurality of output ports of the housing.

BRIEF DESCRIPTION OF THE FIGURES

The present disclosure is illustrated byway of examples, embodiments and the like and is not limited by the accompanying figures, in which like reference numbers indicate similar elements. Elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. The figures along with the detailed description are incorporated and form part of the specification and serve to further illustrate examples, embodiments and the like, and

explain various principles and advantages, in accordance with the present disclosure, where:

FIGS. **1**A to **1**C show various views of a prior art pressure switch. FIGS. **1**A and **1**B illustrate a transverse cross-section of the prior art pressure switch. FIG. **1**C illustrates a longitudinal cross-section of the prior art pressure switch.

FIGS. **2**A to **2**D illustrate various views of one embodiment of a pressure valve in accordance with various aspects set forth herein. FIG. **2**A illustrates one embodiment of a transverse cross-section of the pressure valve including a first portion of a flow coupler in accordance with various aspects set forth herein. FIG. **2**B illustrates one embodiment of a transverse cross-section of the pressure valve including a second portion of the flow coupler in accordance with various aspects set forth herein. FIG. **2**C illustrates one embodiment of another transverse cross-section of the pressure valve including the second portion of the flow coupler in accordance with various aspects set forth herein. FIG. **2**D illustrates one embodiment of a longitudinal cross-section of the pressure valve in accordance with various aspects set forth here in.

FIGS. **3**A to **3**C illustrate various views of another embodiment of a pressure valve in accordance with various aspects set forth herein. FIG. **3**A illustrates another embodiment of a transverse cross-section of the pressure valve in accordance with various aspects set forth herein. FIG. **3**B illustrates another embodiment of a transverse cross-section of the pressure valve in accordance with various aspects set forth herein. FIG. **3**C illustrates another embodiment of a longitudinal cross-section of the pressure valve in accordance with various aspects set forth herein.

FIGS. **4**A to **4**D illustrate another embodiment of a pressure valve in accordance with various aspects set forth herein. FIG. **4**A illustrates another embodiment of a transverse cross-section of the pressure valve including a first portion of a flow coupler in accordance with various aspects set forth herein. FIG. **4**B illustrates another embodiment of a transverse cross-section of the pressure valve including a second portion of the flow coupler in accordance with various aspects set forth herein. FIG. **4**C illustrates another embodiment of another transverse cross-section of the pressure valve including the second portion of the flow coupler in accordance with various aspects set forth herein. FIG. **4**D illustrates another embodiment of a longitudinal cross-section of the pressure valve in accordance with various aspects set forth herein.

FIGS. **5**A to **5**B illustrate various views of another embodiment of a pressure valve in accordance with various aspects set forth herein. FIG. **5**A illustrates another embodiment of a transverse cross-section of the pressure valve in accordance with various aspects set forth herein. FIG. **5**B illustrates another embodiment of a transverse cross-section of the pressure valve in accordance with various aspects set forth herein.

DETAILED DESCRIPTION

The following detailed description is merely illustrative in nature and is not intended to limit the present disclosure, or the application and uses of the present disclosure. Furthermore, there is no intention to be bound by any expressed or implied theory presented in the preceding field of use, background, or summary of the disclosure or the following detailed description. The present disclosure provides various examples, embodiments and the like, which may be described herein in terms of functional or logical block elements. Various techniques described herein my be used for a single and grouped pressure valve. The various aspects described herein are presented as methods, devices (or apparatus), and systems that may include a number of components, elements, members, modules, nodes, peripherals, or the like. Further, these methods, devices, and systems may include or not include additional components, elements, members, modules, nodes, peripherals, or the like.

Throughout the specification and the claims, the following terms take at least the meanings explicitly associated herein, unless the context clearly dictates otherwise. The terms "connect," "connecting," and "connected" mean that one function, feature, structure, or characteristic is directly joined to or in communication with another function, feature, structure, or characteristic. The terms "couple," "coupling," and "coupled" mean that one function, feature, structure, or characteristic is directly or indirectly joined to or in communication with another function, feature, structure, or characteristic. Relational terms such as "first" and "second," and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The term "or" is intended to mean an inclusive or. Further, the terms "a," "an," and "the" are intended to mean one or more unless specified otherwise or clear from the context to be directed to a singular form. The term "include" and its various forms are intended to mean including but not limited to. The terms "substantially," "essentially," "approximately," "about" or any other version thereof are defined as being close to as understood by one of ordinary skill in the art, and in one non-limiting embodiment the term is defined to be within 10%, in another embodiment within 5%, in another embodiment within 1% and in another embodiment within 0.5%.

In the following description, numerous specific details are set forth. However, it is to be understood that embodiments of the disclosed technology may be practiced without these specific details. References to "one embodiment," "an embodiment," "example embodiment," "various embodiments," and other like terms indicate that the embodiments of the disclosed technology so described may include a particular function, feature, structure, or characteristic, but not every embodiment necessarily includes the particular function, feature, structure, or characteristic. Further, repeated use of the phrase "in one embodiment" does not necessarily refer to the same embodiment, although it may.

This disclosure presents a single and grouped pressure valve. By configuring a pressure valve in accordance with various aspects described herein, an improved capability of the pressure valve is provided. For instance, a pressure valve may include a flow coupler positioned within its housing. The housing may include an input port and multiple output ports transversely positioned thereon. The flow coupler may be axially or radially moved within the housing to couple the input port to one or more output ports based on various alignment positions of the flow coupler. Passages through the flow coupler may be used to direct fluid flow from the input port to the one or more output ports. In a first alignment position of the flow coupler in the housing of the pressure valve, a first passage in a first portion of the flow coupler may be used to couple the input port to multiple output ports. In a second alignment position of the flow coupler in the housing of the pressure valve, a second passage in a second portion of the flow coupler may couple the input port to a single output port. In one example, FIGS. **2**A to **2**D illustrate one embodiment of a pressure valve **200***a-d* in accordance with various aspects set forth herein. FIG. **2**A illustrates one embodiment of a transverse cross-

section of the pressure valve **200***a* including a first portion of the flow coupler **203***a* in accordance with various aspects set forth herein. FIGS. **2**B and **2**C illustrate one embodiment of a transverse cross-section of the pressure valve **200***b-c* including a second portion of the flow coupler **203***b-c* in accordance with various aspects set forth herein. FIG. **2**D illustrates one embodiment of a longitudinal cross-section of the pressure valve **200***d* in accordance with various aspects set forth herein. In FIGS. **2**A to **2**D, the pressure valve **200***a-d* may be configured to include a housing **201***a-d* and a flow coupler **203***a-d*. The housing **201***a-d* may be configured to include an input port **211***a-d* and a plurality of output ports **213***a-d* to **216***a-d*. Further, the housing **201***a-d* may be disposed around and may define a cavity. The flow coupler **203***a-d* may be disposed in the cavity of the housing **201***a-d*. A shape of the flow coupler **203***a-d* may allow for rotational or axial movement of the flow coupler **203***a-d* in the cavity of the housing **201***a-d*. In one example, the shape of the flow coupler **203***a-d* may be cylindrical. Further, a shape of the cavity of the housing **201***a-d* may allow for rotational or axial movement of the flow coupler **203***a-d*. In one example, the shape of the cavity of the housing **201***a-d* may be substantially similar to the shape of the flow coupler **203***a-d*. In another example, the shape of the cavity of the housing **201***a-d* may be cylindrical. A longitudinal length of the cavity of the housing **201***a-d* may allow for axial movement of the flow coupler **203***a-d* in the cavity of the housing **201***a-d*.

In FIG. **2**A, the first portion of the flow coupler **203***a* may be configured to include a first passage **205***a*, which may be transversely disposed through the first portion of the flow coupler **203***a*. Further, the first portion of the flow coupler **203***a* may be disposed around and may define the first passage **205***a*. The first portion of the flow coupler **203***a* may be configured to include a first seal **207***a* and a second seal **208***a*. The first seal **207***a* may be coupled to a first end of the first passage **205***a* of the first portion of the flow coupler **203***a*. The first seal **207***a* may be used to couple the first end of the first passage **205***a* to the input port **211***a*, one or more of the plurality of output ports **213***a*-**216***a*, an inner surface of the housing **201***a* or the like. The first seal **207***a* may be a large O-ring. In one example, a radial width of an opening associated with the first seal **207***a* may be about a radial width between the furthest separated output ports of the plurality of output ports **213***a*-**216***a* at an inner surface of the housing **201***a*. In another example, the radial width of the opening associated with the first seal **207***a* may be sufficient to couple the first end of the first passage **205***a* to all of the plurality of output ports **213***a*-**216***a*.

Furthermore, the second seal **208***a* may be coupled to a second end of the first passage **205***a* of the first portion of the flow coupler **203***a*. The second seal **208***a* may be used to couple the second end of the first passage **205***a* to the input port **211***a*, one or more of the plurality of output ports **213***a*-**216***a*, an inner surface of the housing **201***a* or the like. In one example, the first seal **207***a* is used to couple the first end of the first passage **205***a* to the input port **211***a* while the second seal **208***a* is used to couple the second end of the first passage **205***a* to the one or more of the plurality of output ports **213***a*-**216***a*. In another example, the second seal **208***a* is used to couple the second end of the first passage **205***a* to the input port **211***a* while the first seal **207***a* is used to couple the first end of the first passage **205***a* to the one or more of the plurality of output ports **213***a*-**216***a*. The second seal **208***a* may be a large O-ring. In one example, a radial width of an opening associated with the second seal **208***a* at the second end of the first passage **205***a* of the flow coupler **203***a* may be about a radial width between the furthest separated output ports of the plurality of output ports **213***a*-**216***a* at an inner surface of the housing **201***a*. In another example, the radial width of the opening associated with the second seal **208***a* may be sufficient to couple the second end of the first passage **205***a* to all of the plurality of output ports **213***a*-**216***a*.

In FIG. **2**A, the pressure valve **200***a* may be configured to allow the flow coupler **203***a* in the cavity of the housing **201***a* to be placed into a plurality of alignment positions by using axial or radial movement thereof. A first alignment position of the flow coupler **203***a* in the cavity of the housing **201***a* may configure the pressure valve **200***a* to allow fluid flow from the input port **211***a* through the passage **205***a* to one or more of the plurality of output ports **213***a*-**216***a*. In one example, the flow coupler **203***a* is pushed into the cavity of the housing **201***a* to engage the pressure valve **200***a* as a pressure manifold. The first alignment position may couple the input port **211***a* to the first end of the first passage **205***a* using the first seal **207***a*. Further, the first alignment position may couple one or more of the plurality of output ports **213***a*-**216***a* to the second end of the first passage **205***a* using the second seal **208***a*.

In FIGS. **2**B and **2**C, the second portion of the flow coupler **203***b-c* may be configured to include a second passage **206***b-c*, which may be transversely disposed through the second portion of the flow coupler **203***b-c*. Further, the second portion of the flow coupler **203***b-c* may be disposed around and may define the second passage **206***b-c*. The second portion of the flow coupler **203***b-c* may be configured to include a third seal **209***b-c* and a fourth seal **210***b-c*. The third seal **209***b-c* may be coupled to a first end of the second passage **206***b-c*. The third seal **209***b-c* may be used to couple the first end of the second passage **206***b-c* to the input port **211***b-c*, one or more of the plurality of output ports **213***b-c* to **216***b-c*, an inner surface of the housing **201***b-c* or the like. In one example, the third seal **209***b-c* is used to couple the first end of the second passage **206***b-c* to the input port **211***b-c*. The third seal **209***b-c* may be a large O-ring. In one example, a radial width of an opening associated with the third seal **209***b-c* at the first end of the second passage **206***b-c* may allow the second end of the second passage **206***b-c* to radially move to each of the plurality of output ports **213***b-c* to **216***b-c* while coupling the input port **211***b-c* to the first end of the second passage **206***b-c* using the third seal **209***b-c*. In another example, the radial width of the opening associated with the third seal **209***b-c* at the first end of the second passage **206***b* may be about a radial width between the furthest separated output ports of the plurality of output ports **213***b-c* to **216***b-c*. In another example, the radial width of the opening associated with the third seal **209***b-c* may be sufficient to couple the first end of the second passage **206***b-c* to all of the plurality of output ports **213***b-c* to **216***b-c*.

Furthermore, the fourth seal **210***b-c* may be coupled to a second end of the second passage **206***b-c* of the second portion of the flow coupler **203***b-c*. The fourth seal **210***b-c* may be used to couple the second end of the second passage **206***b-c* to the input port **211***b-c*, one or more of the plurality of output ports **213***b-c* to **216***b-c*, an inner surface of the housing **201***b-c* or the like. The fourth seal **210***b-c* may be a small O-ring. A radial width of an opening of the fourth seal **210***b-c* at the second end of the second passage **206***b-c* may be sufficient to allow the second end of the second passage **206***b-c* to couple to one of the plurality of output ports **213***b-c* to **216***b-c*. In one example, a radial width of an opening of the fourth seal **210***b-c* may be about a radial

width of one of the plurality of output ports **213***b-c* to **216***b-c* at the inner wall of the housing **201***b-c*. In another example, the radial width of the opening associated with the fourth seal **210***b-c* may be sufficient to couple the second passage **206***b-c* to one of the plurality of output ports **213***b-c* to **216***b-c*.

In FIG. **2**B, a second alignment position may result from an axial or radial movement of the flow coupler **203***b* in the cavity of the housing **201***b* such as an axial movement from the first alignment position to the second alignment position. The second alignment position may allow fluid flow from the input port **211***b* through the second passage **206***b* to one of the plurality of output ports **213***b*-**216***b*. In one example, the flow coupler **203***b* is pulled away from the cavity of the housing **201***b* to engage the pressure valve **200***b* as a pressure switch. The second alignment position may configure the pressure valve **200***b* to allow fluid flow at one of the plurality of output ports **213***b*-**216***b*. The second alignment position of the flow coupler **203***b* in the cavity of the housing **201***b* may couple the input port **211***b* to the first end of the second passage **206***b* using the third seal **209***b*. Further, the second alignment position may couple one of the plurality of output ports **213***b*-**216***b* to the second end of the second passage **206***b* using the fourth seal **210***b*.

In FIG. **2**C, a third alignment position may result from an axial or radial movement of the flow coupler **203***c* in the cavity of the housing **201***c* such as a radial movement from the second alignment position to the third alignment position. The third alignment position, like the second alignment position, may configure the pressure valve **200***c* to allow fluid flow at another one of the plurality of output ports **213***c*-**216***c*. The third alignment position may couple the input port **211***c* to the first end of the second passage **206***c* using the third seal **209***c*. Further, the third alignment position may couple the other one of the plurality of output ports **213***c*-**216***c* to the second end of the second passage **206***c* using the fourth seal **210***c*. The third alignment position may allow fluid flow from the input port **211***c* through the second passage **206***c* to the other one of the plurality of output ports **213***c*-**216***c*.

In FIG. **2**D, a portion of the cavity **204***d* of the housing **201***d* may be used to allow the flow coupler **203***d* to be axially moved in the cavity of the housing **201***d* such as between the first alignment position and the second alignment position.

In another embodiment, a passage of a flow coupler may be curved or angled such as described in FIGS. **1**A to **1**C.

In another embodiment, a pressure valve may be configured to include a fourth alignment position. The fourth alignment position may result from an axial or radial movement of a flow coupler in a cavity of a housing. The fourth alignment position may configure the pressure valve to allow fluid flow to two or more of the plurality of output ports.

In another embodiment, a pressure valve may be configured to include a fifth alignment position. The fifth alignment position may result from an axial or radial movement of a flow coupler in a cavity of a housing. The fifth alignment position may configure the pressure valve to modify fluid flow to one of the plurality of output ports. In one example, the fluid flow is modified by using a different cross-section for a passage of the flow coupler. In another example, the fluid flow is modified by longitudinally tapering the passage of the flow coupler. In another example, the fluid flow is filtered by a filter such as a porous filter disposed in the passage of the flow coupler.

In another embodiment, a pressure valve may be configured to include a sixth alignment position. The sixth alignment position may result from an axial or radial movement of a flow coupler in a cavity of a housing. The sixth alignment position may configure the pressure valve to couple two or more of the plurality of output ports of the housing without coupling an input port of the housing.

In another embodiment, a pressure valve may be configured to include a seventh alignment position. The seventh alignment position may result from an axial or radial movement of a flow coupler in a cavity of a housing. The seventh alignment position may configure the pressure valve to couple a first side of a first passage of a flow coupler to an inner wall of the housing using a first seal and to couple a second side of the first passage to the inner wall of the housing using a second seal, resulting in no fluid flow from an input port of the housing to any of a plurality of output ports of the housing.

In another embodiment, a pressure valve may be configured to include an eighth alignment position. The eighth alignment position may result from an axial or radial movement of a flow coupler in a cavity of a housing. The eighth alignment position may configure the pressure valve to couple a first side of a second passage of a flow coupler to an inner wall of the housing using a third seal and to couple a second side of the second passage to the inner wall of the housing using a fourth seal, resulting in no fluid flow from an input port of the housing to any of a plurality of output ports of the housing.

In another embodiment, a pressure valve may include a flow coupler positioned within its housing. The housing may include multiple output ports transversely positioned thereon. Further, one end of the flow coupler may include an input port. The flow coupler may be axially or radially moved within the housing to couple the input port of the flow coupler to one or more output ports of the housing based on various alignment positions of the flow coupler. A passage through the flow coupler may be used to direct fluid flow from the input port of the flow coupler to the one or more output ports of the housing. One end of the passage may have a small seal capable of sealing a single output port. Further, the other end of the passage may have a large seal capable of sealing all of the output ports. In a first alignment position of the flow coupler in the housing of the pressure valve, the passage of the flow coupler may couple the input port of the flow coupler to a single output port of the housing using the small seal. In a second alignment position, the passage may be used to couple the input port of the flow coupler to all of the output ports of the housing using the large seal. For example, FIGS. **3**A to **3**C illustrate various views of another embodiment of a pressure valve **300***a-c* in accordance with various aspects set forth herein. FIG. **3**A illustrates another embodiment of a transverse cross-section of the pressure valve **300***a* in accordance with various aspects set forth herein. FIG. **3**B illustrates another embodiment of a transverse cross-section of the pressure valve **300***b* in accordance with various aspects set forth herein. FIG. **3**C illustrates another embodiment of a longitudinal cross-section of the pressure valve **300***c* in accordance with various aspects set forth herein. In FIGS. **3**A to **3**C, the pressure valve **300***a-c* may be configured to include a housing **301***a-c* and a flow coupler **303***a-c*. The flow coupler **303***a-c* may be configured to include an input port **317***a-c* longitudinally disposed in the flow coupler **303***a-c*. The flow coupler **303***a-c* may be disposed around and may define the input port **317***a-c*. The housing **301***a-c* may be configured to include a plurality of output ports **313***a-c* to **316***a-c*. Further,

the housing **301***a-c* may be disposed around and may define a cavity. The flow coupler **303***a-c* may be disposed in the cavity of the housing **301***a-c*. A shape of the flow coupler **303***a-c* may allow for rotational or axial movement of the flow coupler **303***a-c*. In one example, the shape of the flow coupler **303***a-c* may be cylindrical. Further, a shape of the cavity of the housing **301***a-c* may allow for rotational or axial movement of the flow coupler **303***a-c* in the cavity of the housing **301***a-c*. In one example, the shape of the cavity of the housing **301***a-c* may be substantially similar to the shape of the flow coupler **303***a-c*. In another example, the shape of the cavity of the housing **301***a-c* may be cylindrical. A longitudinal length of the cavity of the housing **301***a-c* may allow for axial movement of the flow coupler **303***a-c* in the cavity of the housing **301***a-c*.

In FIGS. **3**A to **3**C, the flow coupler **303***a-c* may be configured to include a passage **305***a-c*, which may be transversely disposed through the flow coupler **303***a-c*. The flow coupler **303***a-c* may be disposed around and may define the passage **305***a-c*. The passage **305***a-c* may be coupled to the input port **317***a-c* of the flow coupler **303***a-c*. The flow coupler **303***a-c* may be configured to include a first seal **307***a-c* and a second seal **308***a-c*. The first seal **307***a-c* may be coupled to a first end of the passage **305***a-c* of the flow coupler **303***a-c*. The first seal **307***a-c* may be used to couple the first end of the passage **305***a-c* to one of the plurality of output ports **313***a-c* to **316***a-c*, an inner surface of the housing **301***a-c* or the like. The first seal **307***a-c* may be a small O-ring. In one example, a radial width of an opening associated with the first seal **307***a-c* may be about a radial width of one of the plurality of output ports **313***a-c* to **316***a-c*. In another example, the radial width of the opening associated with the first seal **307***a-c* may be sufficient to couple the passage **305***a-c* to one of the plurality of output ports **313***a-c* to **316***a-c* of the housing **301***a-c*.

Furthermore, the second seal **308***a-c* may be coupled to a second end of the passage **305***a-c* of the flow coupler **303***a-c*. The second seal **308***a-c* may be used to couple the second end of the passage **305***a-c* to one or more of the plurality of output ports **313***a-c* to **316***a-c*, the inner surface of the housing **301***a-c* or the like. In one example, the second seal **308***a-c* is used to couple the second end of the passage **305***a-c* to the one or more of the plurality of output ports **313***a-c* to **316***a-c* while the first seal **307***a-c* is used to couple the first end of the passage **305***a-c* to the inner surface of the housing **301***a-c*. In another example, the first seal **307***a-c* is used to couple the second end of the passage **305***a-c* to one of the plurality of output ports **313***a-c* to **316***a-c* while the second seal **308***a-c* is used to couple the first end of the passage **305***a-c* to the inner surface of the housing **301***a-c*. The second seal **308***a-c* may be a large O-ring. In one example, a radial width of an opening associated with the second seal **308***a-c* may be about a radial width between the furthest separated output ports of the plurality of output ports **313***a-c* to **316***a-c* at an inner surface of the housing **301***a-c*. In another example, the radial width of the opening associated with the second seal **308***a-c* may be sufficient to couple the passage **305***a-c* to all of the plurality of output ports **313***a-c* to **316***a-c*.

In FIG. **3**A, the pressure valve **300***a* may be configured to allow the flow coupler **303***a* in the cavity of the housing **301***a* to be placed into a plurality of alignment positions by using axial or radial movement thereof. A first alignment position of the flow coupler **303***a* in the cavity of the housing **301***a* may configure the pressure valve **300***a* to allow fluid flow from the input port **317***a* of the flow coupler **303***a* through the passage **305***a* of the flow coupler **303***a* to one or more of the plurality of output ports **313***a*-**316***a* using the second seal **308***a*. In one example, the first alignment position is associated with the input port **317***a* being coupled to all of the plurality of output ports **313***a*-**316***a*.

In FIG. **3**B, a second alignment position of the flow coupler **303***b* in the cavity of the housing **301***b* may configure the pressure valve **300***b* to allow fluid flow from the input port **317***b* of the flow coupler **303***b* through the passage **305***b* of the flow coupler **303***b* to one of the plurality of output ports **313***b*-**316***b* of the housing **301***b* using the first seal **307***b*.

In FIG. **3**C, the input port **317***c* is disposed in the flow coupler **303***c* of the pressure valve **300***c*, which may also be referred to as a handle of the pressure valve **300***c*. When the flow coupler **303***c* is moved in the cavity of the housing **301***c* to the first alignment position, the input port **317***c* of the flow coupler **303***c* may be coupled to the one or more of the plurality of output ports **313***c*-**316***c* of the housing **301***c* using the second seal **308***c*. When the flow coupler **303***c* is radially moved about one hundred and eighty degrees (180°) in the cavity of the housing **301***c* from the first alignment position to the second alignment position, the input port **317***c* of the flow coupler **303***c* may be coupled to one of the plurality of output ports **313***c*-**316***c* of the housing **301***c* using the first seal **307***c*.

Furthermore, a third alignment position of the flow coupler **303***c* in the cavity of the housing **301***c* may configure the pressure valve **300***c* to allow fluid flow from the input port **317***c* of the flow coupler **303***c* to another output port **319***c* of the housing **301***c*. A portion of the cavity **304***c* of the housing **301***c* may be used to allow the flow coupler **303***c* to be axially moved. In one example, the flow coupler **303***c* is pushed into the cavity of the housing **301***c* to engage the pressure valve **300***c* in the third alignment position. The third alignment position may be associated with the input port **317***c* of the flow coupler **303***c* being coupled to the other output port **319***c* of the housing **301***c*. An elastic object **321***c* such as a spring may be positioned in the portion of the cavity **304***c* of the housing **301***c*, which may be used to counteract a force of the fluid flow through the input port **317***c* of the flow coupler **303***c*.

In another embodiment, a fourth alignment position may be associated with axially or radially moving a flow coupler in a cavity of a housing so that a passage of the flow coupler is coupled to inner walls of the housing using a first seal and a second seal.

In another embodiment, a pressure valve may include a flow coupler positioned within its housing. The housing may include an input port and multiple output ports transversely positioned thereon. The flow coupler may be axially or radially moved within the housing to couple the input port to one or more output ports based on various alignment positions of the flow coupler. A passage through the flow coupler may be used to direct fluid flow from the input port to the one or more output ports. One end of the passage may have a small seal capable of sealing a single output port. Further, the other end of the passage may have a large seal capable of sealing all of the output ports. In a first alignment position of the flow coupler in the housing of the pressure valve, the passage of the flow coupler may couple the input port to a single output port. In this position, the large seal may be used to couple the passage to the input port, which allows the flow coupler to be radially moved to couple the passage to any one of the output ports. In a second alignment position, the passage may be used to couple the input port to all of the output ports. In this position, the large seal may be used to couple the passage to all of the output ports while the

small seal may be used to couple the passage to the input port. For example, FIGS. **4**A to **4**D illustrate another embodiment of a pressure valve **400***a-d* in accordance with various aspects set forth herein. FIG. **4**A illustrates another embodiment of a transverse cross-section of the pressure valve **400***a* in accordance with various aspects set forth herein. FIG. **4**B illustrates another embodiment of a transverse cross-section of the pressure valve **400***b* in accordance with various aspects set forth herein. FIG. **4**C illustrates another embodiment of a transverse cross-section of the pressure valve **400***b* in accordance with various aspects set forth herein. FIG. **4**D illustrates another embodiment of a longitudinal cross-section of the pressure valve **400***c* in accordance with various aspects set forth herein. In FIGS. **4**A to **4**D, the pressure valve **400***a-d* may be configured to include a housing **401***a-d* and a flow coupler **403***a-d*. The housing **401***a-d* may be configured to include an input port **411***a-d* transversely disposed in the housing **401***a-d*. The housing **401***a-d* may be disposed around and may define the input port **411***a-d*. The housing **401***a-d* may be configured to include a plurality of output ports **413***a-d* to **416***a-d*. Further, the housing **401***a-d* may be disposed around and may define a cavity. The flow coupler **403***a-d* may be disposed in the cavity of the housing **401***a-d*. A shape of the flow coupler **403***a-d* may allow for rotational or axial movement of the flow coupler **403***a-d* in the cavity of the housing **401***a-d*. In one example, the shape of the flow coupler **403***a-d* may be cylindrical. Further, a shape of the cavity of the housing **401***a-d* may allow for rotational or axial movement of the flow coupler **403***a-d*. In one example, the shape of the cavity of the housing **401***a-d* may be substantially similar to the shape of the flow coupler **403***a-d*. In another example, the shape of the cavity of the housing **401***a-d* may be cylindrical. A longitudinal length of the cavity of the housing **401***a-d* may allow for axial movement of the flow coupler **403***a-d* in the cavity of the housing **401***a-d*.

In FIGS. **4**A to **4**D, the flow coupler **403***a-d* may be configured to include a passage **405***a-d*, which may be transversely disposed through the flow coupler **403***a-d*. The flow coupler **403***a-d* may be disposed around and may define the passage **405***a-d*. The flow coupler **403***a-d* may be configured to include a first seal **407***a-d* and a second seal **408***a-d*. The first seal **407***a-d* may be coupled to a first end of the passage **405***a-d* of the flow coupler **403***a-d*. The first seal **407***a-d* may be used to couple the first end of the passage **405***a-d* to the input port **411***a-d*, one of the plurality of output ports **413***a-d* to **416***a-d*, an inner surface of the housing **401***a-d* or the like. The first seal **407***a-d* may be a small O-ring. In one example, a radial width of an opening associated with the first seal **407***a-d* may be about a radial width of one of the plurality of output ports **413***a-d* to **416***a-d* at the inner surface of the housing **401***a-d*. In another example, the radial width of the opening associated with the first seal **407***a-d* may be sufficient to couple the passage **405***a-d* to one of the plurality of output ports **413***a-d* to **416***a-d*. In another example, the radial width of the opening associated with the first seal **407***a-d* may be sufficient to couple the passage **405***a-d* to the input port **411***a-d*.

Furthermore, the second seal **408***a-d* may be coupled to a second end of the passage **405***a-d* of the flow coupler **403***a-d*. The second seal **408***a-d* may be used to couple the second end of the passage **405***a-d* to the input port **411***a-d*, one or more of the plurality of output ports **413***a-d* to **416***a-d*, an inner surface of the housing **401***a-d* or the like. In one example, the first seal **407***a-d* is used to couple the first end of the passage **405***a-d* to the one of the plurality of output ports **413***a-d* to **416***a-d* while the second seal **408***a-d* is used to couple the second end of the passage **405***a-d* to the input port **411***a-d*. In another example, the second seal **408***a-d* is used to couple the second end of the passage **405***a-d* to all of the plurality of output ports **413***a-d* to **416***a-d* while the first seal **407***a-d* is used to couple the first end of the passage **405***a-d* to the input port **411***a-d*. The second seal **408***a-d* may be a large O-ring. In one example, a radial width of an opening associated with the second seal **408***a-d* may be about a radial width between the furthest separated output ports of the plurality of output ports **413***a-d* to **416***a-d* at the inner surface of the housing **401***a-d*. In another example, the radial width of the opening associated with the second seal **408***a-d* may be sufficient to couple the passage **405***a-d* to all of the plurality of output ports **413***a-d* to **416***a-d*. In another example, the radial width of the second seal **408***a-d* may be sufficient to allow the first end of the passage **405***a-d* to radially move to each of the plurality of output ports **413***a-d* to **416***a-d* while coupling the input port **411***a-d* to the second end of the passage **405***a-d* using the second seal **408***a-d*.

In FIG. **4**A, the pressure valve **400***a* may be configured to allow the flow coupler **403***a* in the cavity of the housing **401***a* to be placed into a plurality of alignment positions by using axial or radial movement thereof. A first alignment position of the flow coupler **403***a* in the cavity of the housing **401***a* may configure the pressure valve **400***a* to allow fluid flow from the input port **411***a* coupled to the first end of the passage **405***a* using the first seal **407***a* to all of the plurality of output ports **413***a*-**416***a* coupled to the second end of the passage **405***a* using the second seal **408***a*.

In FIG. **4**B, a second alignment position of the flow coupler **403***b* in the cavity of the housing **401***b* may configure the pressure valve **400***b* to allow fluid flow from the input port **411***b* coupled to the second end of the passage **405***b* using the second seal **408***b* to one of the plurality of output ports **413***b*-**416***b* coupled to the first end of the passage **405***b* using the first seal **407***b*.

In FIG. **4**C, a third alignment position of the flow coupler **403***c* in the cavity of the housing **401***c* may configure the pressure valve **400***c* to allow fluid flow from the input port **411***c* coupled to the second end of the passage **405***c* using the second seal **408***c* to another one of the plurality of output ports **413***c*-**416***c* coupled to the first end of the passage **405***c* using the first seal **407***c*.

In FIG. **4**D, a fourth alignment position of the flow coupler **403***d* in the cavity of the housing **401***d* may configure the pressure valve **400***d* to allow fluid flow from another input port **418***d* of the housing **401***d* to another output port **419***d* of the housing **401***d*. A portion of the cavity **404***d* of the housing **401***d* may be used to allow the flow coupler **403***d* to be axially moved to a plurality of positions. In one example, the flow coupler **403***d* is pushed into the cavity of the housing **401***d* to engage the pressure valve **400***d* in the fourth alignment position.

In another embodiment, a method may include, at a pressure valve including a housing having an input port and a plurality of output ports and a flow coupler having a passage transversely disposed therethrough, wherein the flow coupler is disposed in a cavity defined by the housing and is movable within the cavity, positioning the flow coupler in the cavity of the housing to a first alignment position to allow fluid flow from the input port of the housing through the passage of the flow coupler to one of the plurality of output ports of the housing. Further, the method may include positioning the flow coupler in the cavity of the housing to a second alignment position to allow fluid flow from the input port of the housing through the passage of the

flow coupler to one or more of the plurality of output ports of the housing. Also, the method may include positioning the flow coupler in the cavity of the housing to a third alignment position to allow fluid flow from the input port of the housing through the passage of the flow coupler to another of the plurality of output ports of the housing.

In another embodiment, a pressure valve may include a flow coupler positioned within its housing. The housing may include an input port and multiple output ports longitudinally positioned thereon. The flow coupler may be axially or radially moved within the housing to couple the input port to one or more output ports based on various alignment positions of the flow coupler. Passages through the flow coupler may be used to direct fluid flow from the input port to the one or more output ports. In a first alignment position of the center flow coupler in the pressure valve, a first passage in a first portion of the center flow coupler may be used to couple the input port to a single output port. In a second alignment position, a second passage in a second portion of the center flow coupler may be used to couple the input port to multiple output ports. For example, FIGS. **5**A and **5**B illustrate various views of another embodiment of a pressure valve **500***a-b* in accordance with various aspects set forth herein. FIG. **5**A illustrates another embodiment of a transverse cross-section of the pressure valve **500***a* in accordance with various aspects set forth herein. FIG. **5**B illustrates another embodiment of a transverse cross-section of the pressure valve **500***b* in accordance with various aspects set forth herein. In FIGS. **5**A to **5**B, the pressure valve **500***a-b* may be configured to include a housing **501***a-b* and a flow coupler **503***a-b*. The flow coupler **503***a-b* may be configured to include an input port **517***a-b* longitudinally disposed in and defined by the flow coupler **503***a-c*. The housing **501***a-b* may be configured to include a plurality of output ports **513***a-b* to **516***a-b* longitudinally positioned on the housing **501***a-b*, with each of the plurality of output ports transversely disposed in and defined by the housing **501***a-b*. Further, the housing **501***a-b* may be disposed around and may define a longitudinal cavity. The flow coupler **503***a-b* may be disposed in the longitudinal cavity of the housing **501***a-b*. A shape of the flow coupler **503***a-b* may allow for rotational or axial movement of the flow coupler **503***a-b* in the cavity of the housing **501***a-b*. In one example, the shape of the flow coupler **503***a-b* may be cylindrical, rectangular or the like. Further, a shape of the cavity of the housing **501***a-b* may allow for rotational or axial movement of the flow coupler **503***a-b*. In one example, the shape of the cavity of the housing **501***a-b* may be substantially similar to the shape of the flow coupler **503***a-b*. In another example, the shape of the cavity of the housing **501***a-b* may be cylindrical rectangular or the like. The pressure valve **500***a-b* may be configured to allow the flow coupler **503***a-b* in the cavity of the housing **501***a-b* to be placed into a plurality of alignment positions by using axial or radial movement thereof. The flow coupler **503***a-b* may be capable of axial or radial movement in the cavity of the housing **501***a-b*.

In FIGS. **5**A and **5**B, the flow coupler **503***a-b* may be configured to include a first passage **505***a-b* and a second passage **506***a-b*. The first passage **505***a-b* may be disposed in and defined by a first portion of the flow coupler **503***a-b*. Further, the second passage **506***a-b* may be disposed in and defined by a second portion of the flow coupler **503***a-b*. Each of the first passage **505***a-b* and the second passage **506***a-b* may be coupled to the input port **517***a-b* of the flow coupler **503***a-b*. The flow coupler **503***a-b* may be configured to include a first seal **507***a-b*, a second seal **508***a-b*, a third seal **509***a-b* and a fourth seal **510***a-b*. The first seal **507***a-b* may be coupled to one side of the first passage **505***a-b* of the flow coupler **503***a-b* and the second seal **508***a-b* may be coupled to another side of the first passage **505***a-b* of the flow coupler **503***a-b*. The first seal **507***a-b* and the second seal **508***a-b* may provide a seal for the passage **505***a-b*. Further, the first seal **507***a-b* and the second seal **508***a-b* may be an O-ring. Similarly, the third seal **509***a-b* may be coupled to one side of the second passage **506***a-b* of the flow coupler **503***a-b* and the fourth seal **510***a-b* may be coupled to another side of the second passage **506***a-b* of the flow coupler **503***a-b*. The third seal **509***a-b* and the fourth seal **510***a-b* may provide a seal for the second passage **506***a-h*. Further, the third seal **509***a-b* and the fourth seal **510***a-b* may be an O-ring.

In FIG. **5**A, a first alignment position of the flow coupler **503***a* in the cavity of the housing **501***a* may position a first portion of the flow coupler **503***a* with one of the plurality of output ports **513***a*-**516***a*. The first alignment position may be associated with the pressure valve **500***a* providing fluid flow from the input port **517***a* of the flow coupler **503***a* through the first passage **505***a* of the flow coupler **503***a* to one of the plurality of output ports **513***a*-**516***a* using the first seal **507***a* and the second seal **508***a*.

In FIG. **5**B, a second alignment position of the flow coupler **503***b* in the cavity of the housing **501***b* may position a second portion of the flow coupler **503***a* with one or more of the plurality of output ports **513***a*-**516***a*. The second alignment position may be associated with the pressure valve **500***b* providing fluid flow from the input port **517***b* of the flow coupler **503***b* through the second passage **506***b* of the flow coupler **503***b* to one or more of the plurality of output ports **513***b*-**516***b* of the housing **501***b* using the third seal **509***b* and the fourth seal **510***b*. In one example, the second alignment position is associated with the input port **517***b* being coupled to all of the plurality of output ports **513***b*-**516***b*.

It is important to recognize that it is impractical to describe every conceivable combination of components or methodologies for purposes of describing the claimed subject matter. However, a person having ordinary skill in the art will recognize that many further combinations and permutations of the subject technology are possible. Accordingly, the claimed subject matter is intended to cover all such alterations, modifications, and variations that are within the spirit and scope of the claimed subject matter.

Although the present disclosure describes specific examples, embodiments, and the like, various modifications and changes may be made without departing from the scope of the present disclosure as set forth in the claims below. For example, although the example methods, devices and systems, described herein are in conjunction with a configuration for the aforementioned single and grouped pressure valve, the skilled artisan will readily recognize that the example methods, devices or systems may be used in other methods, devices or systems and may be configured to correspond to such other example methods, devices or systems as needed. Further, while at least one example, embodiment, or the like has been presented in the foregoing detailed description, many variations exist. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of the present disclosure. Any benefits, advantages, or solutions to problems that are described herein with regard to specific embodiments are not intended to be construed as a critical, required, or essential feature or element of any or all of the claims. Any benefits, advantages, or solutions to problems that are described herein with regard to specific examples,

embodiments, or the like are not intended to be construed as a critical, required, or essential feature or element of any or all of the claims.

What is claimed is:

1. A pressure valve, comprising:

a housing having a first input port and a plurality of output ports and defining a cavity disposed therein;

a flow coupler disposed in the cavity of the housing and having a passage transversely disposed therethrough, wherein the flow coupler is movable within the cavity of the housing;

wherein the flow coupler further includes a first seal coupled to a first end of the passage of the flow coupler and a second seal coupled to a second end of the passage of the flow coupler;

wherein the first seal couples the first end of the passage of the flow coupler to the input port of the housing and the second seal couples the second end of the passage of the flow coupler to one or more of the plurality of output ports of the housing;

wherein a first alignment position of the flow coupler in the cavity of the housing allows fluid flow from the first input port of the housing through the passage of the flow coupler to all of the plurality of output ports of the housing; and

wherein a second alignment position of the flow coupler in the cavity of the housing allows fluid flow from the first input port of the housing through the passage of the flow coupler to one of the plurality of output ports of the housing.

2. The pressure valve of claim 1, wherein a third alignment position of the flow coupler in the cavity of the housing allows fluid flow from the input port of the housing through the passage of the flow coupler to another one of the plurality of output ports of the housing.

3. The pressure valve of claim 1, wherein each of the first seal and the second seal is an O-ring.

4. The pressure valve of claim 1, wherein the first seal couples the first end of the passage of the flow coupler to one of the plurality of output ports of the housing and the second seal couples the second end of the passage of the flow coupler to the input port of the housing.

5. The pressure valve of claim 1, wherein the flow coupler in the cavity of the housing is rotated from the first alignment position to the second alignment position.

6. The pressure valve of claim 1, wherein the housing further includes a second input port and a second output port; and

wherein a fourth alignment position of the flow coupler in the cavity of the housing allows fluid flow from the second input port of the housing through the passage of the flow coupler to the second output port of the housing.

7. A pressure valve, comprising:

a housing having an input port and a plurality of output ports and defining a cavity disposed therein;

a flow coupler disposed in the cavity of the housing and moveable therein, wherein a first portion of the flow coupler has a first passage transversely disposed therethrough and a second portion of the flow coupler has a second passage transversely disposed therethrough;

wherein the flow coupler further includes a first seal coupled to a first end of the first passage of the flow coupler, a second seal coupled to a second end of the first passage of the flow coupler, a third seal coupled to a first end of the second passage of the flow coupler and a fourth seal coupled to a second end of the second passage of the flow coupler;

wherein the first seal couples the first end of the first passage of the flow coupler to the input port of the housing and the second seal couples the second end of the first passage of the flow coupler to one or more of the plurality of output ports of the housing;

wherein a first alignment position of the flow coupler in the cavity of the housing allows fluid flow from the input port of the housing through the first passage of the flow coupler to all of the plurality of output ports of the housing; and

wherein a second alignment position of the flow coupler in the cavity of the housing allows fluid flow from the input port of the housing through the second passage of the flow coupler to one of the plurality of output ports of the housing.

8. The pressure valve of claim 7, wherein a third alignment position of the flow coupler in the cavity of the housing allows fluid flow from the input port of the housing through the second passage of the flow coupler to another one of the plurality of output ports of the housing.

9. The pressure valve of claim 7, wherein the flow coupler in the cavity of the housing is axially moved from the first alignment position to the second alignment position.

10. The pressure valve of claim 7, wherein each of the first seal, the second seal, the third seal and the fourth seal is an O-ring.

11. The pressure valve of claim 7, wherein the third seal couples the first end of the second passage of the flow coupler to the input port of the housing and the fourth seal couples the second end of the second passage of the flow coupler to one of the plurality of output ports of the housing.

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